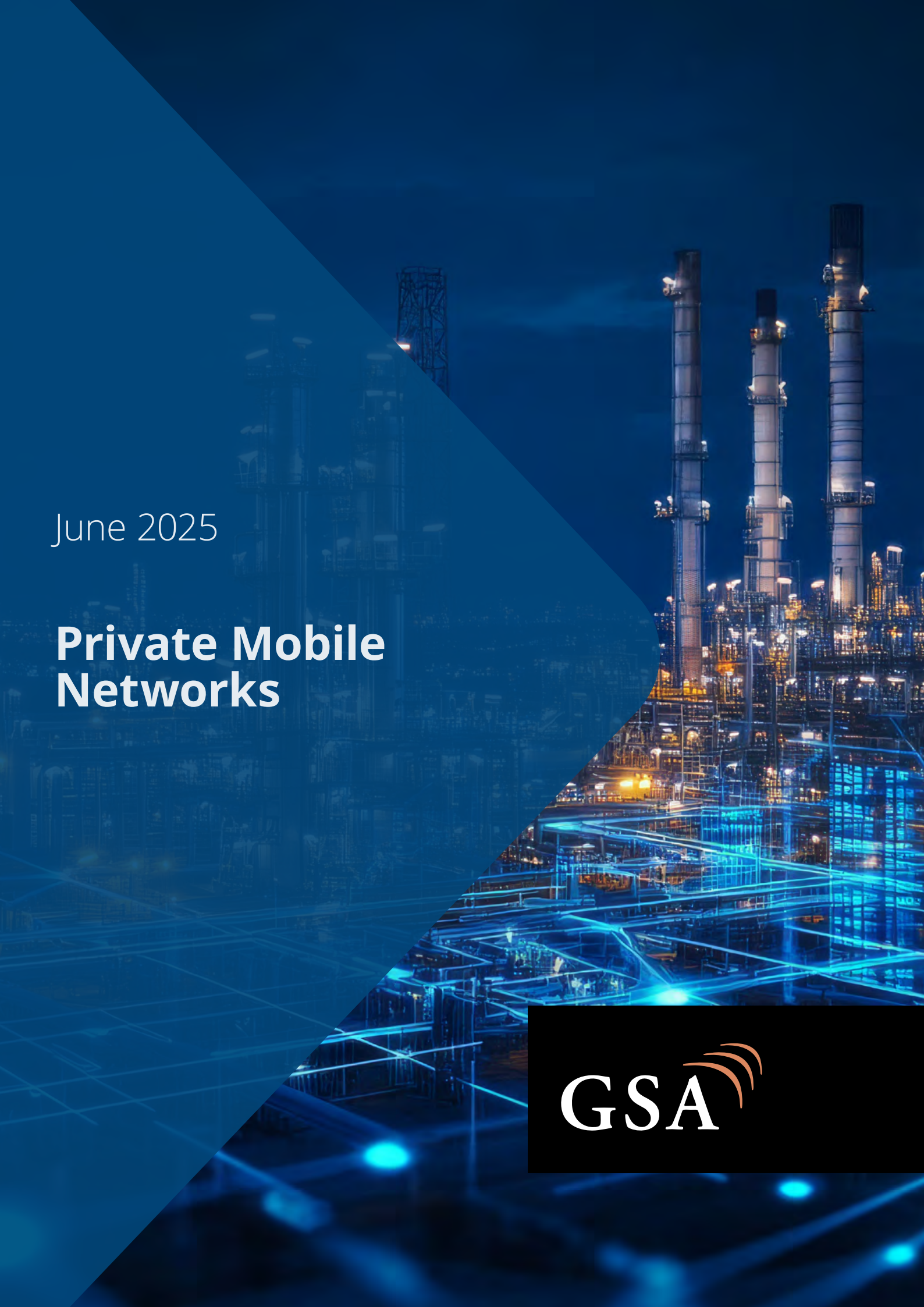

June 2025

Private Mobile Networks

GSA

Market Status: Key Messages in 1Q25

- GSA counts customer references as unique organisations or government entities deploying one or more 3GPP-based 4G LTE or 5G networks in a given country, valued at over €100,000. From May 2024, we also count references worth between €50,000 and €100,000, some of which may include trials. Data for references worth between €50,000 and €100,000 is only from 2024
- Total customer references to 1Q25 stand at 1,772, deploying at least one network. A further 137 references are valued between €50,000 and €100,000. Net additions over €100,000 in the quarter were 58 references, up from 1,714 in 4Q24, with a further eight additions in the €50,000 to €100,000 range. This does not consider site expansions and new revenue from existing customers
- The quarter was marked by macroeconomic turbulence, as businesses grappled with uncertainty about shifts in global trade policy. However, members of the GSA Private Mobile Networks Special Interest Group (SIG) generally view these disruptions as short-lived, with business investment activity normalising after 1Q25
- The pace of acquiring new customer references slowed, but SIG members noted meaningful expansion within existing accounts, including the deployment of additional networks and new sites. GSA aims to reflect this internal growth more comprehensively in its 2Q25 update by incorporating enhanced reporting metrics — specifically, more detail on roll-outs per site
- Please note that one unnamed vendor was unable to provide customer references this quarter, which may affect the interpretation of overall results. This data may be backdated and incorporated into GSA's 2Q25 update where applicable
- On average, 74% of references in our database are non-public and unique, submitted by SIG members. This is higher for some industries, with more than 80% of sectors such as military and defence, maritime and power plants not visible in the public domain
- The SIG now represents 17 companies, including 450Alliance, 5G-ACIA, AI-Link, Airspan, Celona, Dell, Ericsson, GSMA, JMA Wireless, Keysight Technologies, Mavenir, Monogoto, Nokia, OnGo Alliance, OneLayer, PrivateLTEand5G.com and TCCA
- There are 80 countries with at least one private mobile network. We note a strong, positive correlation between the number of private mobile network references and countries with dedicated spectrum. Private mobile networks are mainly in high- and upper-middle-income regions so far, with the United States, Germany, the United Kingdom, China and Japan having the most references. It is sometimes reported that China has a high number of networks, reaching over 40,000, but we believe a large portion use the public network and therefore do not meet our definition
- Manufacturing was the fastest-growing industry, adding eight new references in 1Q25, followed by mining and seaports, with five new customer references each. Manufacturing, education and academic research and mining remain the top three sectors for customer references, although this does not represent the actual size and scale of deployments, which vary by user type
- Of the top 10 reporting countries, the United States and Finland grew 4% from 4Q24, followed by the United Kingdom, up 2%. Ireland jumped 33% and Belgium 10%, but from a smaller total

Introduction

Demand for private mobile networks based on 4G LTE[1], and increasingly 5G[2] technologies, is being driven by the spiralling data, security, digitisation and mobility requirements of modern enterprise and government entities. Organisations of all types are combining connected systems with big data and analytics to transform operations, increase automation and efficiency or deliver new services. Wireless networking with LTE or 5G enables these transformations to take place even in the most dynamic, remote or highly secure environments while offering the scale benefits of a technology that has already been deployed worldwide.

The arrival of LTE-Advanced systems delivered a step change in network capacity, throughput and deterministic latency. 5G networks will bring increased densities of users and devices, even greater capacity and further improvements to latency that enable use of mobile technology for time-critical applications.

Private mobile networks are often part of a broader digital transformation programme. This could include the introduction or development of cloud networking and other digital technologies such as artificial intelligence, machine learning and data analytics. More and more applications of the private mobile network will use these capabilities combined with mobile connectivity.

1 The set of requirements that need to be fulfilled by a 4G LTE system is defined by the IMT-Advanced specifications. 3GPP implements this in Release 8 through Release 14.

2 The set of requirements that need to be fulfilled by a 5G system is defined by the IMT-2020 specifications. 3GPP implements this in Release 15 through Release 18, which is the latest release in current development.

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In addition to companies looking to deploy their own private mobile network for the first time, there is a large group of potential customers that currently operate private networks based on technologies such as TETRA, P25, Digital Mobile Radio, GSM-R and Wi-Fi. Many of these customers are demanding critical broadband services that are simply not available from alternative technologies, so private mobile networks based on LTE and 5G could eventually replace much of this market.

The exact number of existing private mobile networks is hard to determine, as details are not often made public. Even trying to track the number of existing customers can also be challenging. To improve information about this market, GSA now maintains a database of customer deployments of private LTE and 5G networks worldwide.

The definition of a private mobile network used in this report is a 3GPP-based 4G LTE or 5G network intended for the sole use of private entities, such as enterprises, industries and governments. They can use only physical elements, RAN or Core, or a combination of physical and virtual elements — for example hosted by a public land mobile network — but as a minimum, a dedicated network core must be implemented. The definition includes MulteFire or Future Railway Mobile Communication System. The network must use spectrum defined in 3GPP, be generally intended for business-critical or mission-critical operational needs, and where it is possible to identify commercial value, the database includes contracts worth more than €50,0000 and between €50,000 and €100,000 to filter out small demonstration network deployments.

Private mobile networks are usually not offered to the general public, although GSA's analysis does include the following: educational institutions that provide mobile broadband to student homes; private fixed wireless access networks deployed by communities for homes and businesses; city or town networks that use local licences to provide wireless services in libraries or public places (possibly offering Wi-Fi with 3GPP wireless backhaul), which are not an extension of the public network.

Non-3GPP networks such as those using Wi-Fi, TETRA, P25, WiMAX, Sigfox, LoRa and proprietary technologies are excluded from the data set. Network implementations using solely network slices from public networks or placement of virtual networking functions on a router are also excluded. Where identifiable, extensions of the public network (such as one or two extra sites deployed at a location, as opposed to dedicated private networks) are excluded. These items may be described in the press as a type of private network.

GSA has identified 80 countries and territories where customers have deployed private networks based on LTE or 5G. There are private mobile network installations in various offshore locations serving the oil and gas industries, as well as on ships.

GSA has gathered information about 1,772 organisations known to be deploying LTE or 5G private mobile networks. Some organisations may be removed from the database and analysis between updates of this report, owing to a lack of evidence that they met the definition criteria. These examples may be added again in the future. References are periodically removed for a few main reasons:

- The definition has been revised by the SIG and as such the reference no longer met the criteria
- More information about the reference has become available meaning that it no longer meets the criteria
- The trial or proof of concept has come to end, or the deployment was only temporary
- A confidential reference has been made public and therefore is removed as a confidential reference and added as a public reference
- The discovery of duplicate entries or double-counted submissions.

Almost three-quarters of the references included in GSA's database have been provided by companies on the basis of anonymity, and information for these private mobile network references will generally not be found in the public domain.

GSA would like to thank its contributing members 450Alliance, Airspan, Celona, Ericsson, Keysight Technologies, Mavenir, Nokia and OneLayer for sharing complete or partial information about their network deployments to enable this data set and report to be produced. The SIG started in 2022, with Nokia, Ericsson and Huawei contributing customer references. In 2023, Airspan, Keysight Technologies, OneLayer and Mavenir started contributing, joined by 450Alliance and Celona in 2024.

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Players and Market Statistics

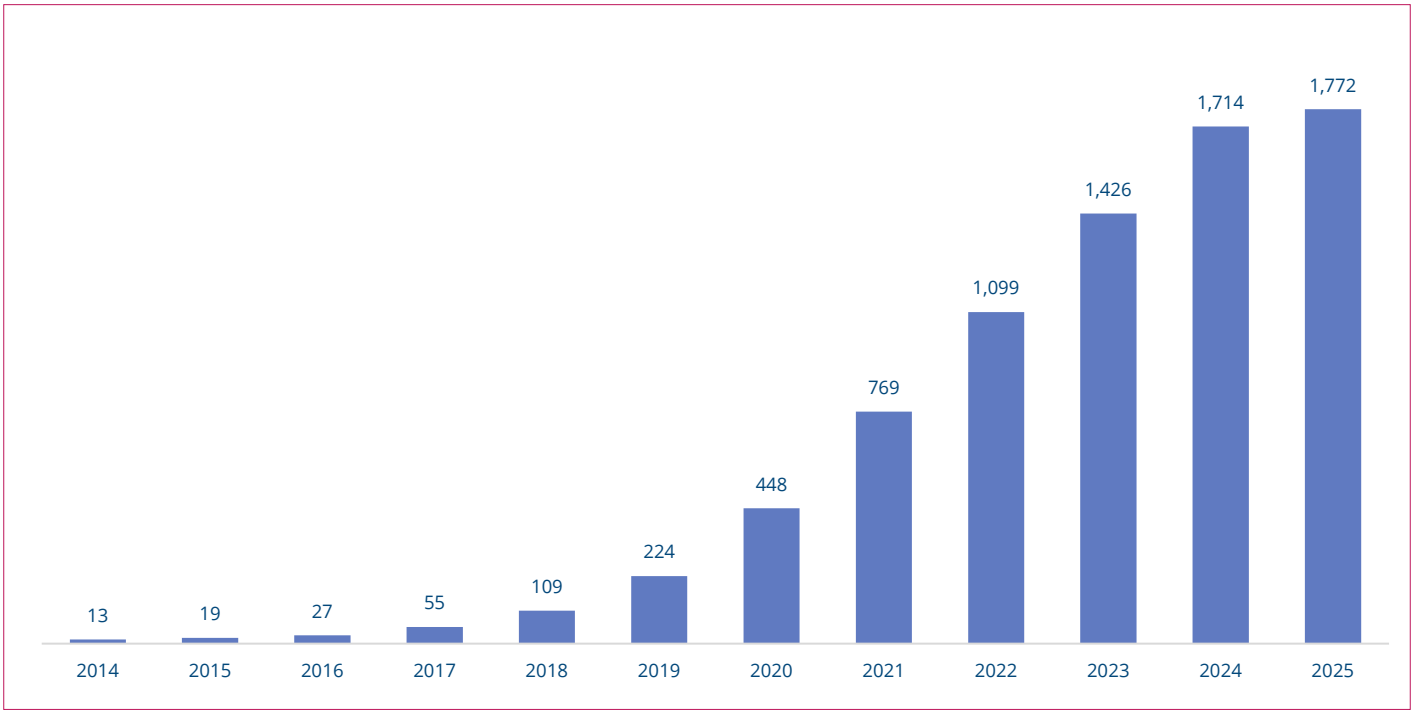
The private mobile network market is home to a wide range of service providers, including equipment and technology suppliers, mobile network operators, system integrators and the private network end users, who sometimes take responsibility for installing or operating their own infrastructure.

GSA has counted over 50 equipment vendors that have been involved in the supply of equipment for private mobile networks based on LTE or 5G. Commercial availability of pre-integrated solutions from several equipment providers increased in 2021; these solutions aim to simplify adoption of private networks, which should add market impetus. In addition, GSA has identified more than 66 telecom network operators (counting national operators within the same group as distinct entities) involved with private mobile network projects. Many other types of player, such as systems integrators, consulting firms and software core vendors are also involved to varying degrees with private mobile network projects.

Also, global-scale cloud providers, often referred to as hyperscalers, are offering private mobile network solutions, sometimes in partnership with mobile operators or network suppliers. Their ability to exploit mass-scale cloud infrastructure and their existing presence in commercial enterprises are likely to drive additional growth in the private mobile network market.

Our latest data shows that in the first quarter of 2025, there were 1,772 total private network customers, of which 58 were new additions. This marks a slight decline from the prior quarter but an improvement on a year earlier, when 43 references were added. It should be noted that slowdown in the number of announcements is not representative of slowing growth in market activity — rather, existing customers are continuing to scale trials to multisite deployments, and announcements will greatly vary in the size of contract value. Customer announcements grew at a compound annual growth rate of 63% from the end of 2017 to 2024 (see Figure 1).

Figure 1. Private mobile network customer references of more than €100,000, by year announced



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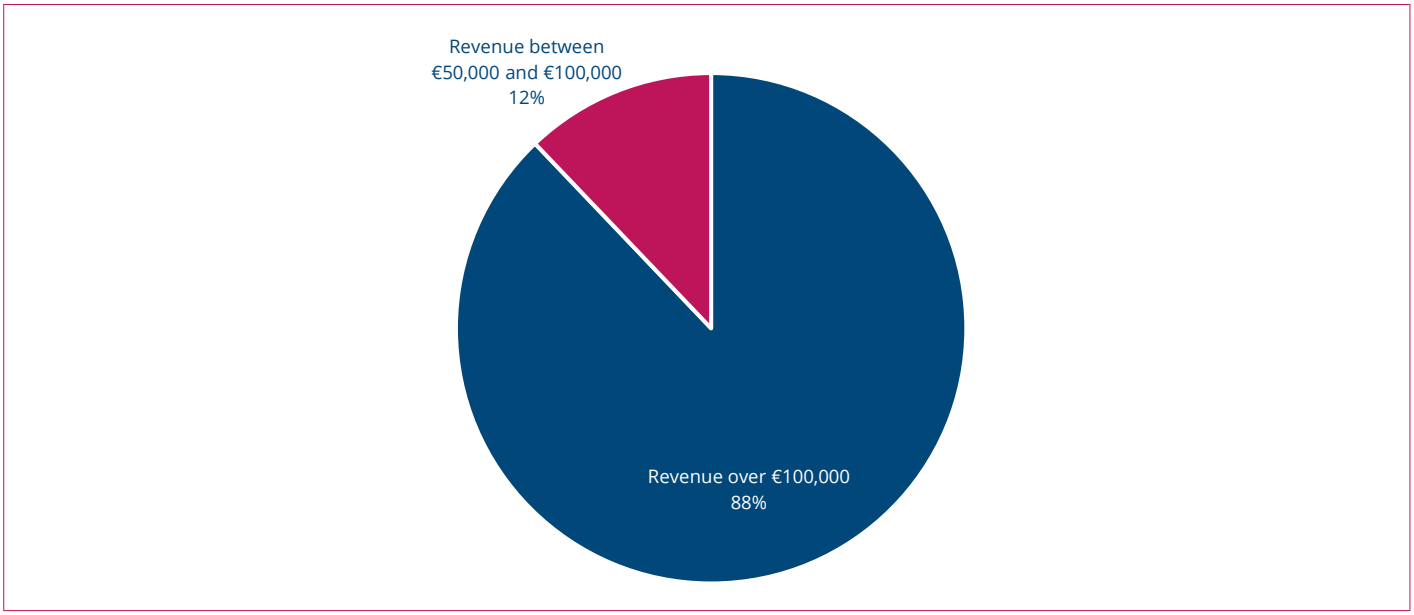
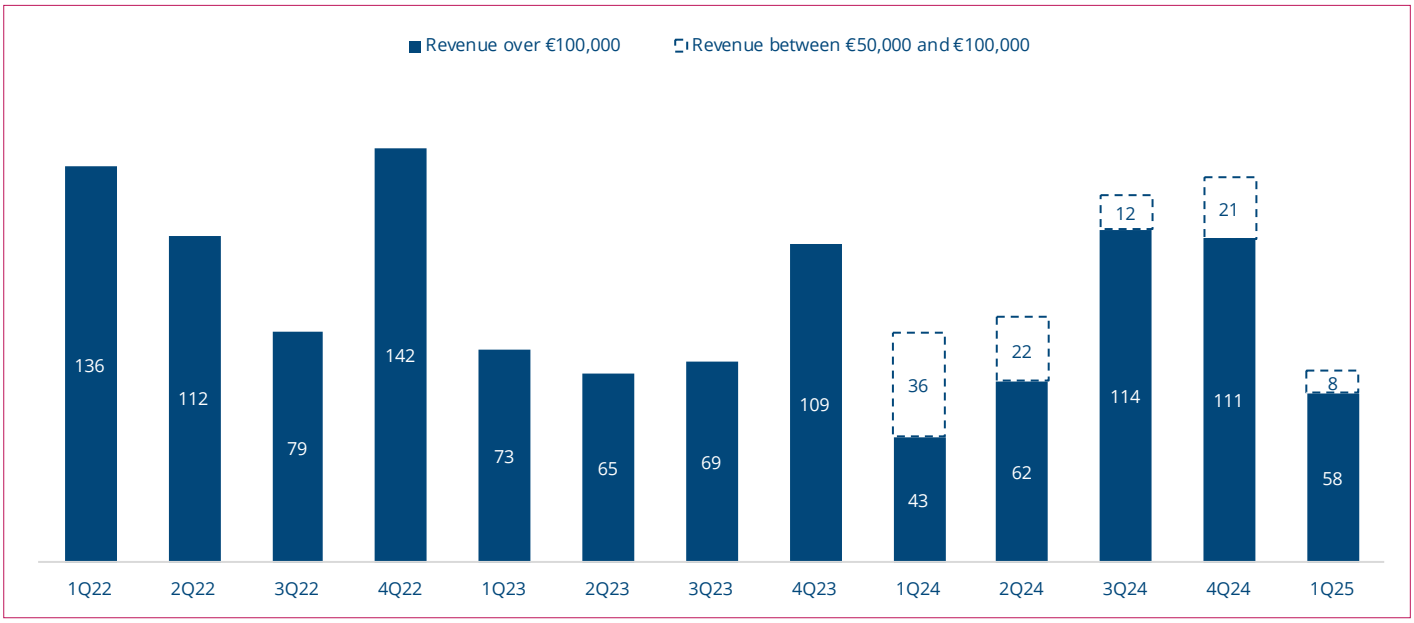
From 2024, GSA data includes private network deployments with values between €50,000 and €100,000. In 1Q25, GSA added eight customer references worth between €50,000 and €100,000, which accounted for 12% of the total number of new references. Figure 2 shows the split of customer references by valuation.

Figure 2. Private mobile network customer references added in 1Q25, split by value



Note that customer references worth between €50,000 and €100,000 are not included in the overall total of 1,772 customer references, as demonstrated in Figure 3.

Figure 3. Net private mobile network customer references additions per quarter (2024 showing data on customer references worth €50,000 to €100,000)



Note: Historical figures have been updated to reflect only customer references deployed from 2024 onward

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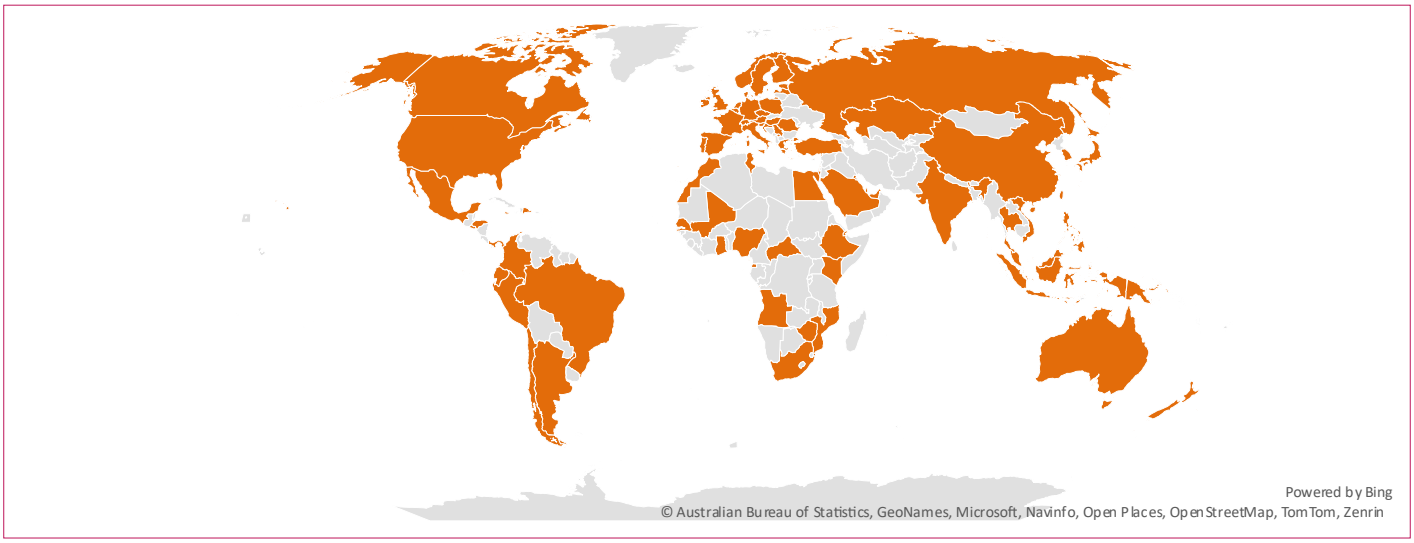
GSA categorised 1,772 customers deploying private mobile networks in 1Q25, which as Figure 4 shows, were located in 80 countries and territories. Where organisations have subsidiaries in different countries or territories deploying their own networks, each subsidiary is counted separately.

Figure 4. Countries and territories with organisations catalogued as deploying private mobile networks worth more than €100,000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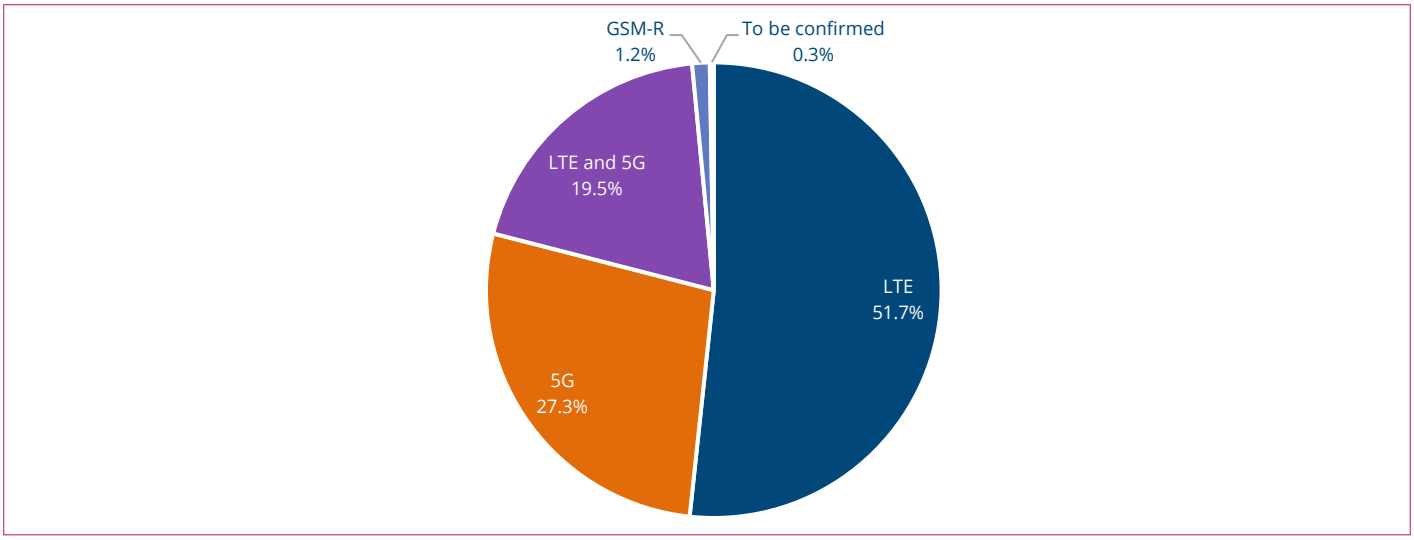
LTE is used in 1,261 of the catalogued customers deploying private mobile networks for which GSA has data; 5G is being deployed in 829, or 47%, of these customers (see Figure 5). Compared with 4Q24, this represents a decrease in the proportion of customers with an LTE-only from 52.0% to 51.7%. Note that these numbers represent the technology used in the initial contract win and some may have since upgraded to 5G or added 5G since deployment — although this is not yet a common occurrence.

Figure 5. Private mobile network customers by technology used (base: 1,772 catalogued customers deploying private wireless networks with revenue greater than €100,000)



Although the proportion of 5G deployments makes up a significant number of references, it must be noted that this number skews toward long-term trials and deployments within educational and test-bed or validation facilities, with a limited number running real operations in industrial situations.

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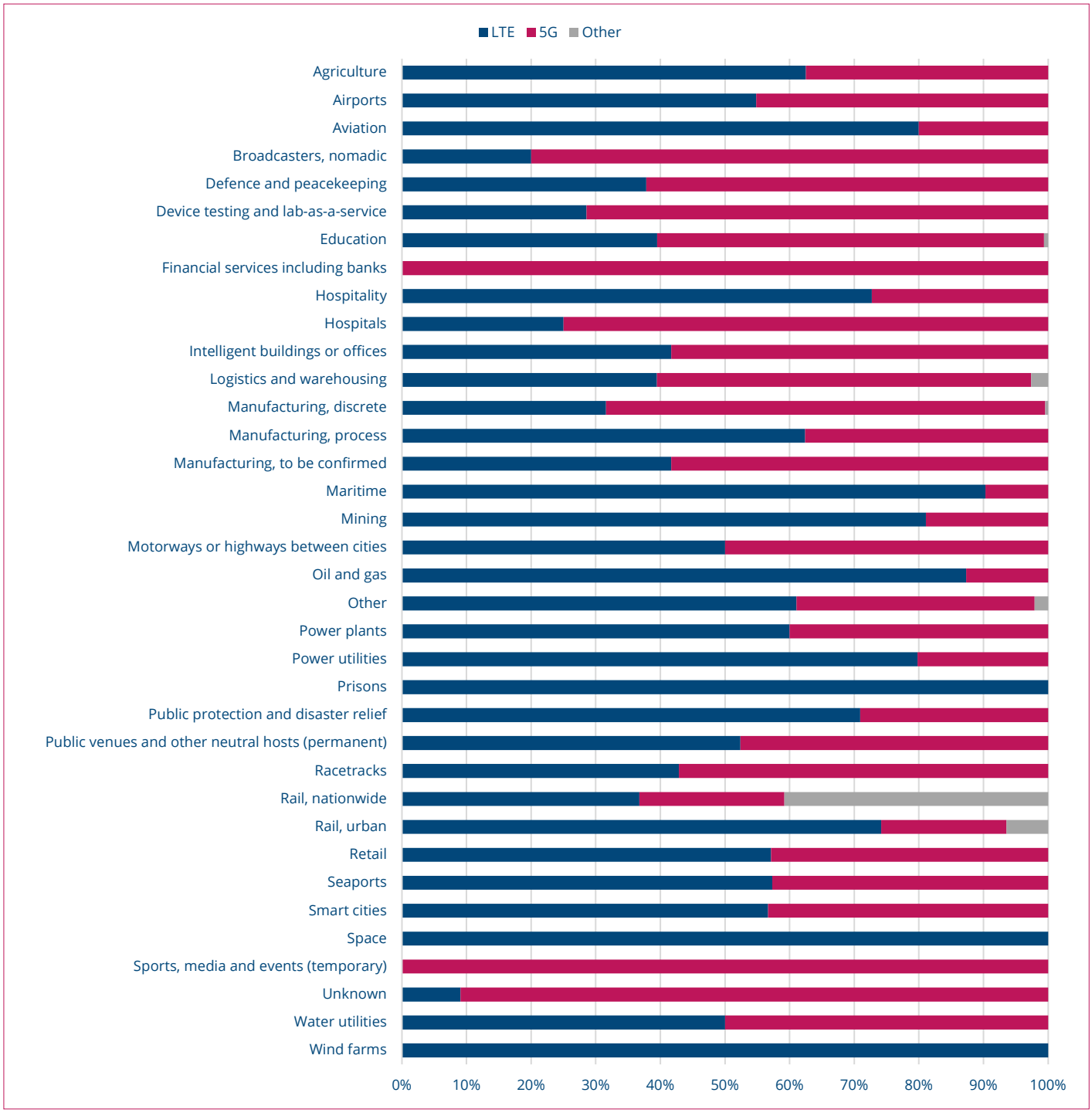
Use of LTE and 5G is variable by industry, as shown in Figure 6. Some industries, like hospitals, favour 5G, whereas LTE is more dominant in sectors such as oil and gas and mining. GSM-R, a secure voice and data communication platform specifically for the rail industry, is being deployed in 1.2% of these customers. Of the 1,003 private network customers announced since 2022, 5G was used in 53.3% of references.

Figure 6. Private mobile network technology used, by industry (base: 1,772 catalogued customers deploying private wireless networks with revenue greater than €100,00)



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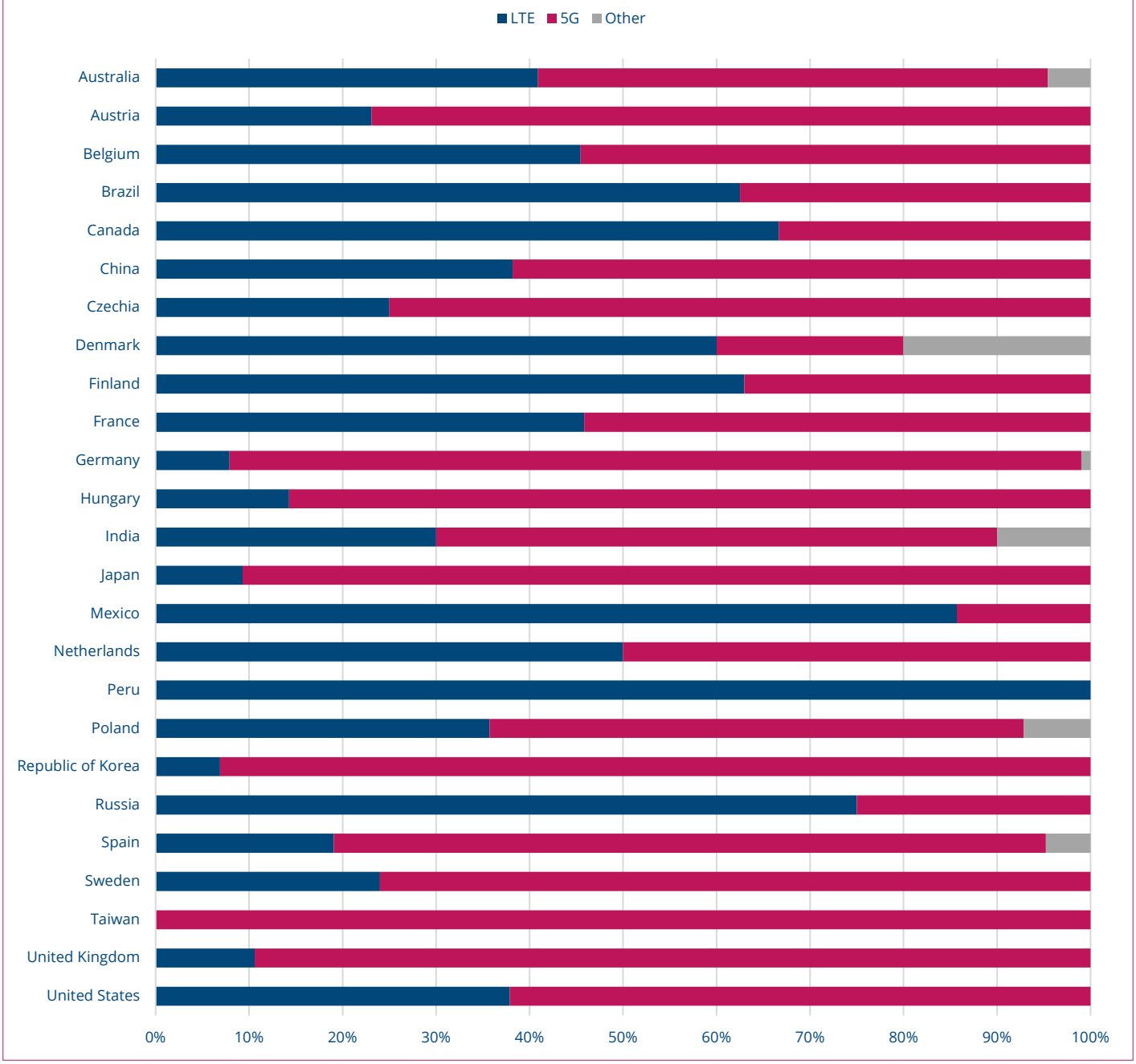
Use of LTE and 5G also varies between countries, as shown in Figure 7. For example, 5G is dominant in Germany, the Republic of Korea and Taiwan, as is LTE in Latin American countries — these differences are often attributed to the spectrum allocated by regulators in these countries.

Figure 7. Private mobile network technology used, by country (base: 1,772 catalogued customers deploying private wireless networks with revenue greater than €100,000)



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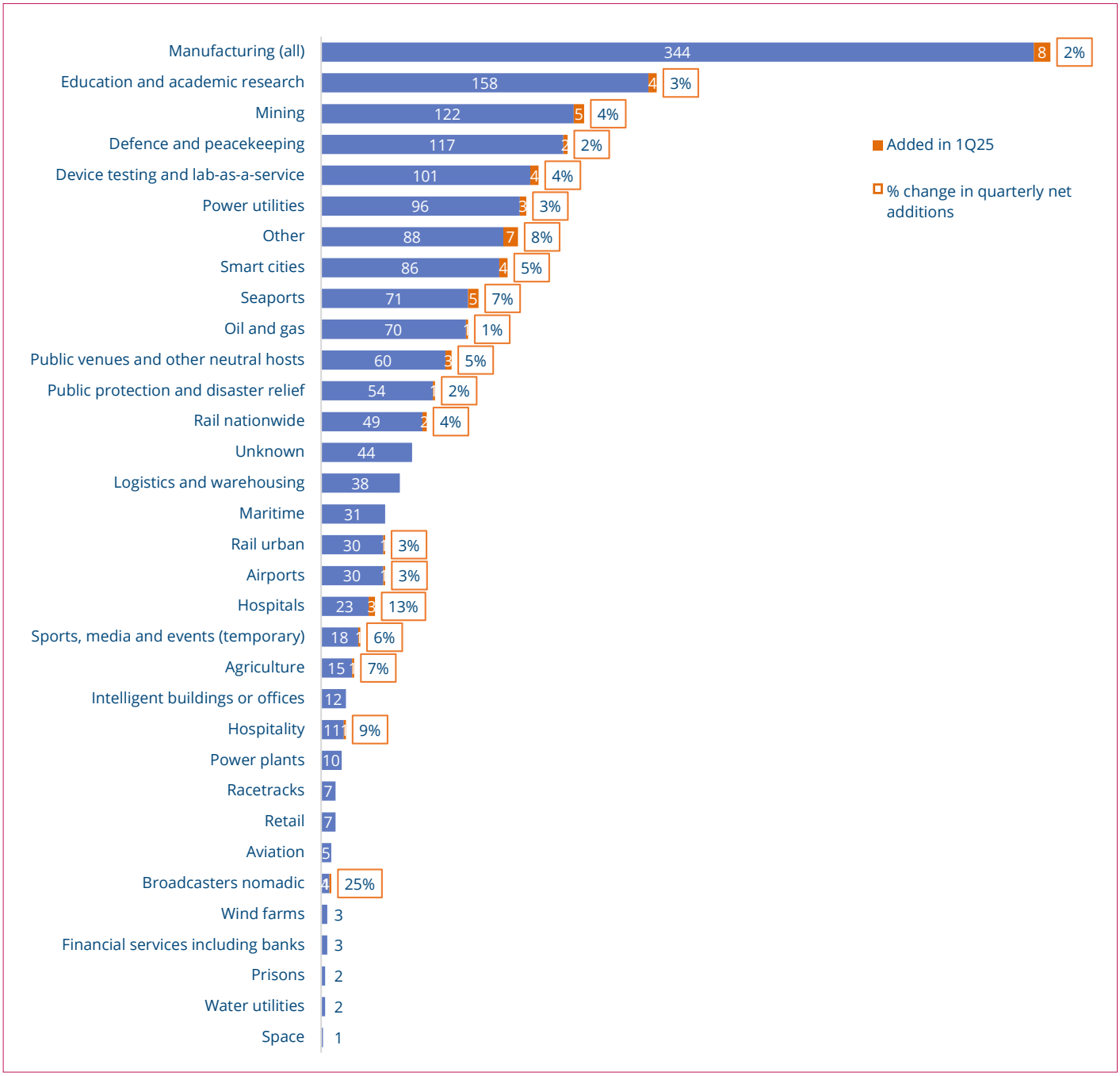
As we build our database, GSA's data indicates that the manufacturing sector is a strong adopter of private mobile networks in terms of the number of customer deployments, with 352 identified companies, up from 344 at the end of 2024. The education and academic research sector is the second most-common group, with 162 customers deploying private networks, followed by mining companies (127) and defence and peacekeeping (119). Device testing and lab-as-a-service (105) and power utility (99) companies round out the top five (see Figure 8).

Figure 8. Number of identified customers deploying private mobile networks in trials and commercially, by sector (base: 1,772 organisations deploying private wireless networks with revenue greater than €100,000)


Manufacturing (all) 344 8 2%
Education and academic research 158 4 3%
Mining 122 5 4%
Defence and peacekeeping 117 2 2%
Device testing and lab-as-a-service 101 4 4%
Power utilities 96 3 3%
Other 88 7 8%
Smart cities 86 4 5%
Seaports 71 5 7%
Oil and gas 70 1 1%
Public venues and other neutral hosts 60 3 5%
Public protection and disaster relief 54 1 2%
Rail nationwide 49 2 4%
Unknown 44
Logistics and warehousing 38
Maritime 31
Rail urban 30 1 3%
Airports 30 1 3%
Hospitals 23 3 13%
Sports, media and events (temporary) 18 1 6%
Agriculture 15 1 7%
Intelligent buildings or offices 12
Hospitality 11 1 9%
Power plants 10
Racetracks 7
Retail 7
Aviation 5
Broadcasters nomadic 4 25%
Wind farms 3
Financial services including banks 3
Prisons 2
Water utilities 2
Space 1
Added in 1Q25
% change in quarterly net additions

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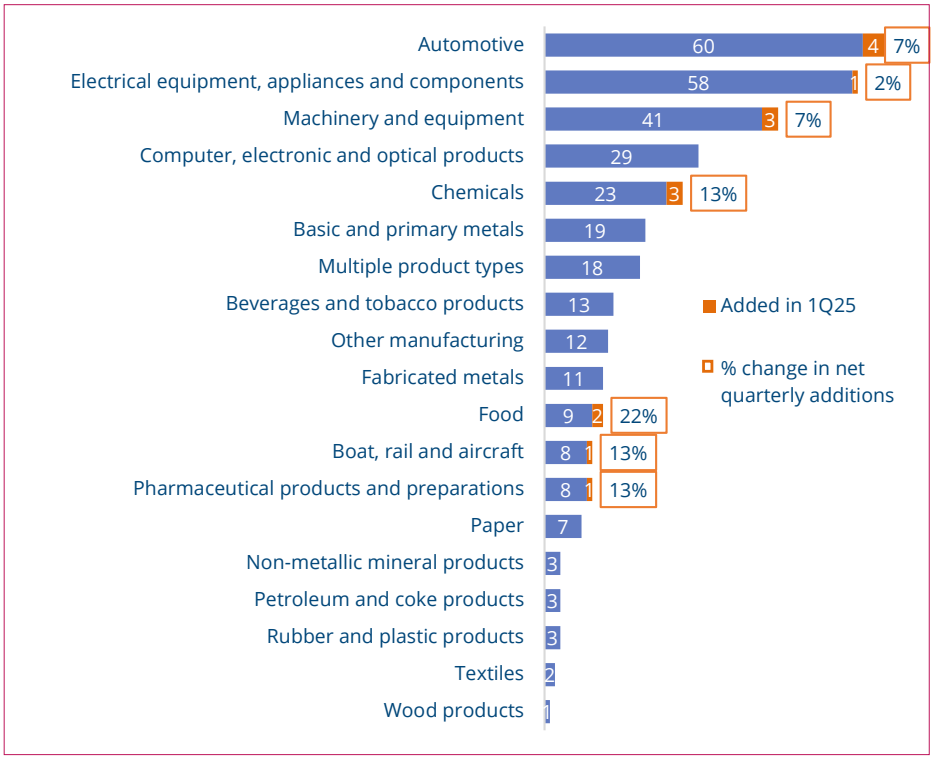
Breakouts of the manufacturing sector, separated into process and discrete with further subcategories, are shown in Figure 9. There are 231 discrete manufacturing customers deploying private networks, compared with 109 process manufacturing customers, with an additional 12 to be confirmed.

Of the subcategories, automotive continues its lead, having overtaken electrical equipment, appliances and components in 4Q24. Both machinery and equipment and chemicals added three new customers. Food added two, up 22% from 4Q24. Both boat, rail and aircraft and pharmaceutical products and preparations grew 13%.

Readers should bear in mind that although the data gives an indication of the number of customers deploying private wireless networks, it does not provide a view of the market value of each segment nor a total number of networks deployed.

Figure 9. Number of manufacturing customers deploying private mobile networks in trials and commercially by subcategory where identified (base: 352 organisations deploying private wireless networks with revenue greater than €100,000)



For example, in some market segments, such as utilities or public protection and disaster relief, a customer deployment could represent a nationwide network deployment, equivalent in value to many hundreds or potentially thousands of campus-style private networks. Figure 10 shows the change in user types over time and the growth of manufacturing and education and academic research in the past five years.

Figure 10. Total private mobile network customers by user type per year (references with revenue greater than €100,000)

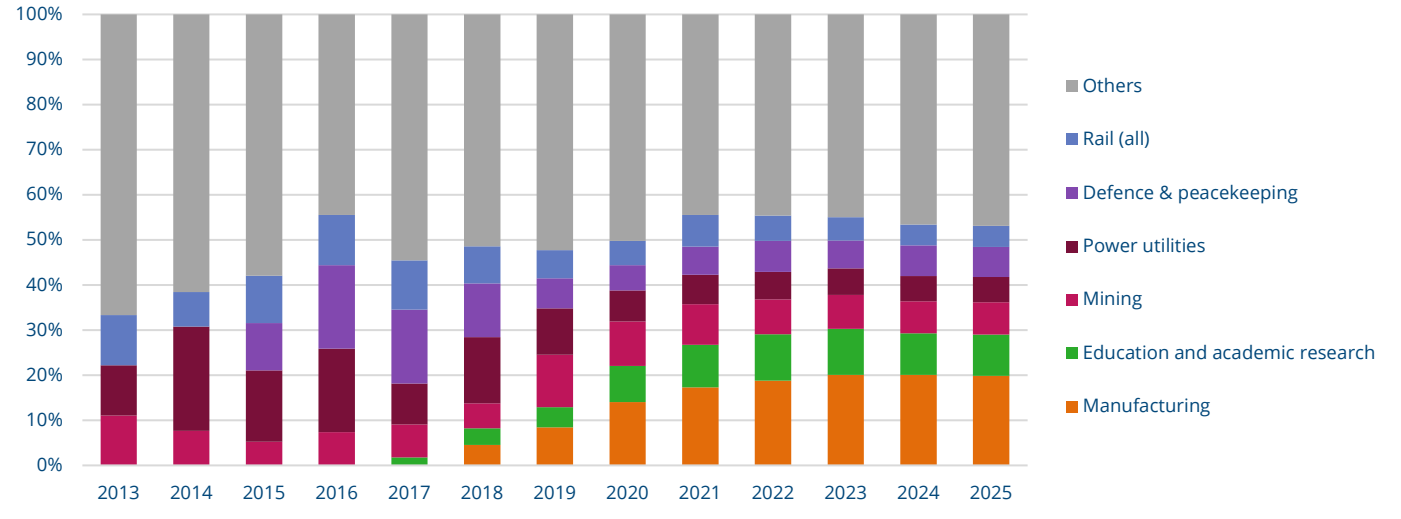


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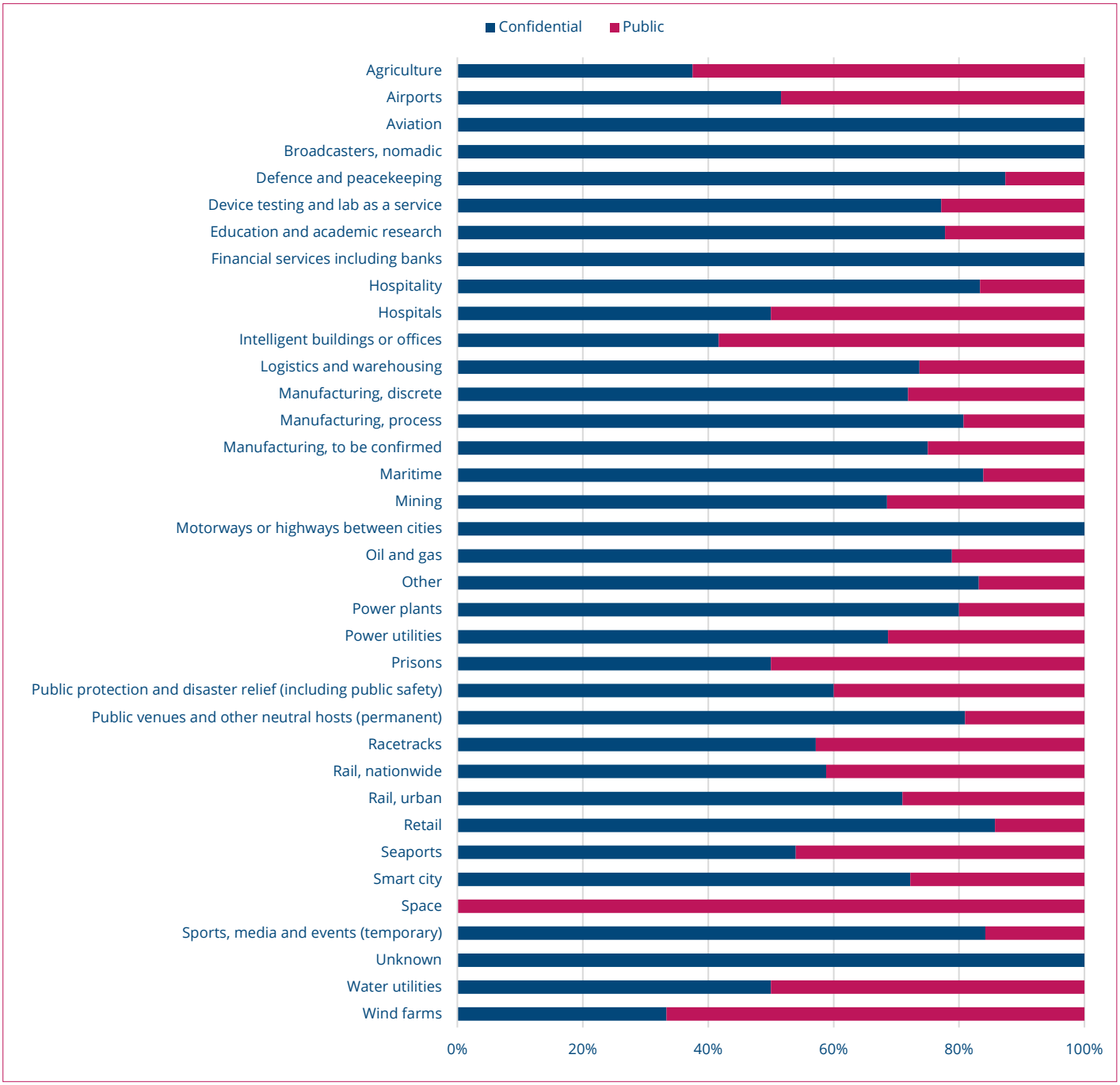
Figure 11 shows customer references by sector, split by those that can be found publicly and those that are confidential as submitted by members of the SIG. Please note that 74% of references included are non-public and some sectors have no public networks at all.

Figure 11. Private mobile network customers by sector, split by confidential and public



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GSA also tracks the spectrum bands used for customer deployments assigned specifically for local or private network purposes.

Figure 12 shows that, including known spectrum assignments and customer deployments, CBRS spectrum (which is technically within the C-band, but split out owing to the unusual way it has been assigned in the United States) is the most widely assigned and added four references in 1Q25. This quarter, we have combined the millimetre-wave spectrum bands into one label, based on feedback from the SIG. This explains the larger number in this spectrum band than in the previous report.

Telecom regulators are showing signs of making increased allocations of dedicated spectrum available for private mobile networks — typically small tranches in specified locations. This could be acquired directly by organisations instead of mobile operators, giving industries an alternative deployment model.

Dedicated spectrum of this sort has already been allocated in France, the United States, Germany, the United Kingdom and Japan. There is typically a strong, positive correlation between the number of private network references and countries with dedicated spectrum. GSA expects this trend to continue in other countries through 2025.

Although the United States has dedicated spectrum for private mobile networks, the shared model of the CBRS band also supports such networks. In the CBRS model, PAL and GAA licensees must accept priority for existing users (United States Department of Defense and Naval radar systems) along exclusion zones that cover much of the United States coastline.

Figure 13 provides a breakdown of customer deployments by region.

Figure 12. Spectrum bands used for private mobile networks; number of customer deployments identified using each band (base: 369 customer references with revenue greater than €100,000)

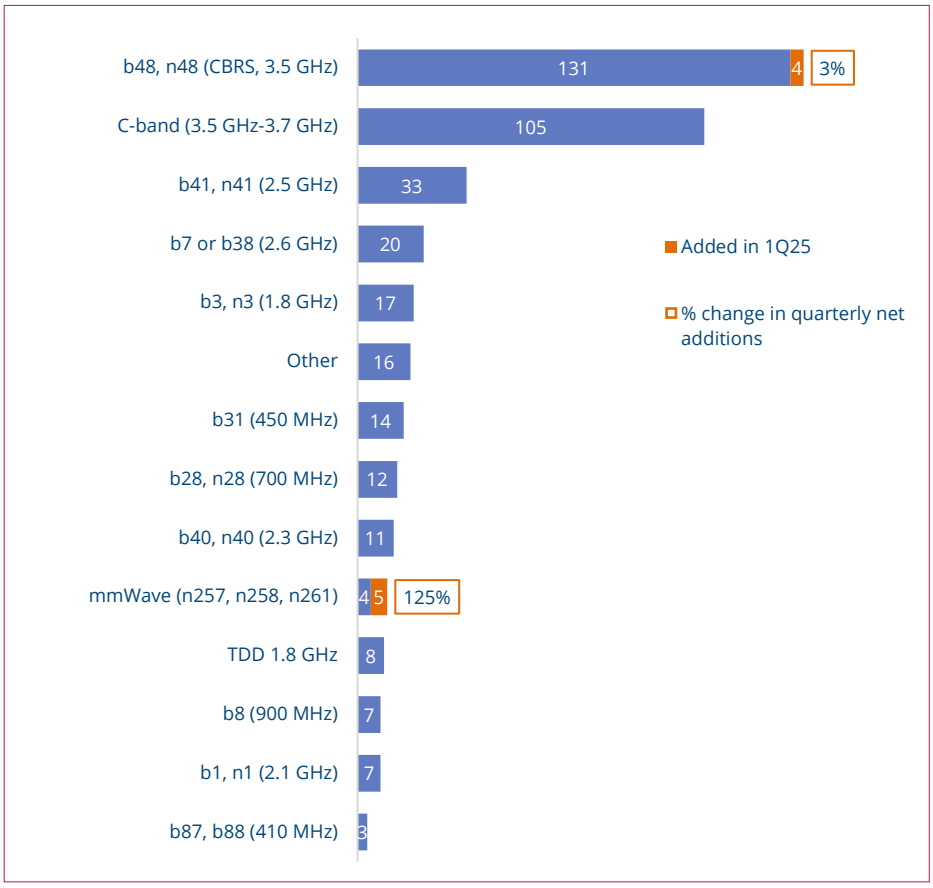

Figure 13. Customer references of private mobile networks, by region (base: 1,772 catalogued customers deploying private wireless networks with revenue greater than €100,000)

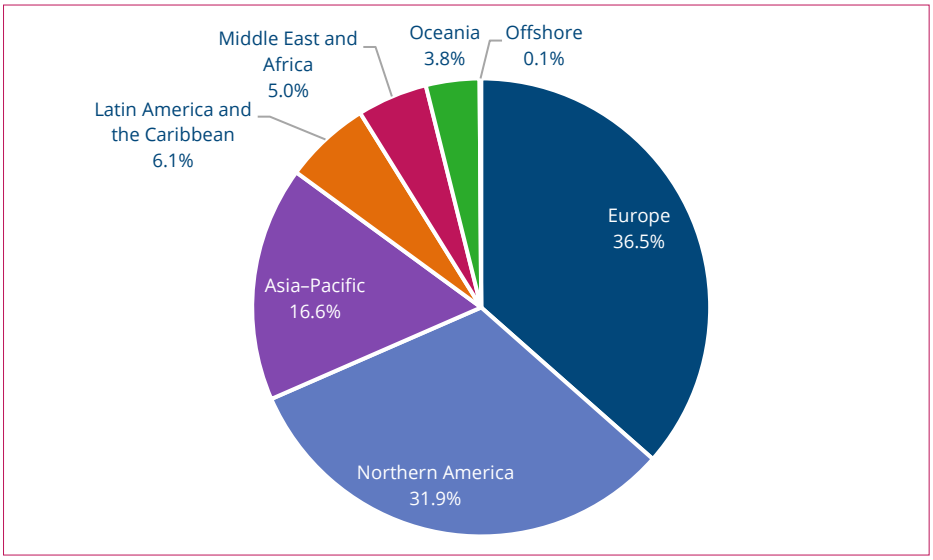

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Figure 14 shows the total number of LTE or 5G customer deployments by country. The United States currently has the most customers at 338, and Germany (101), the United Kingdom (66), China (55) and Japan (43) round out the top five.

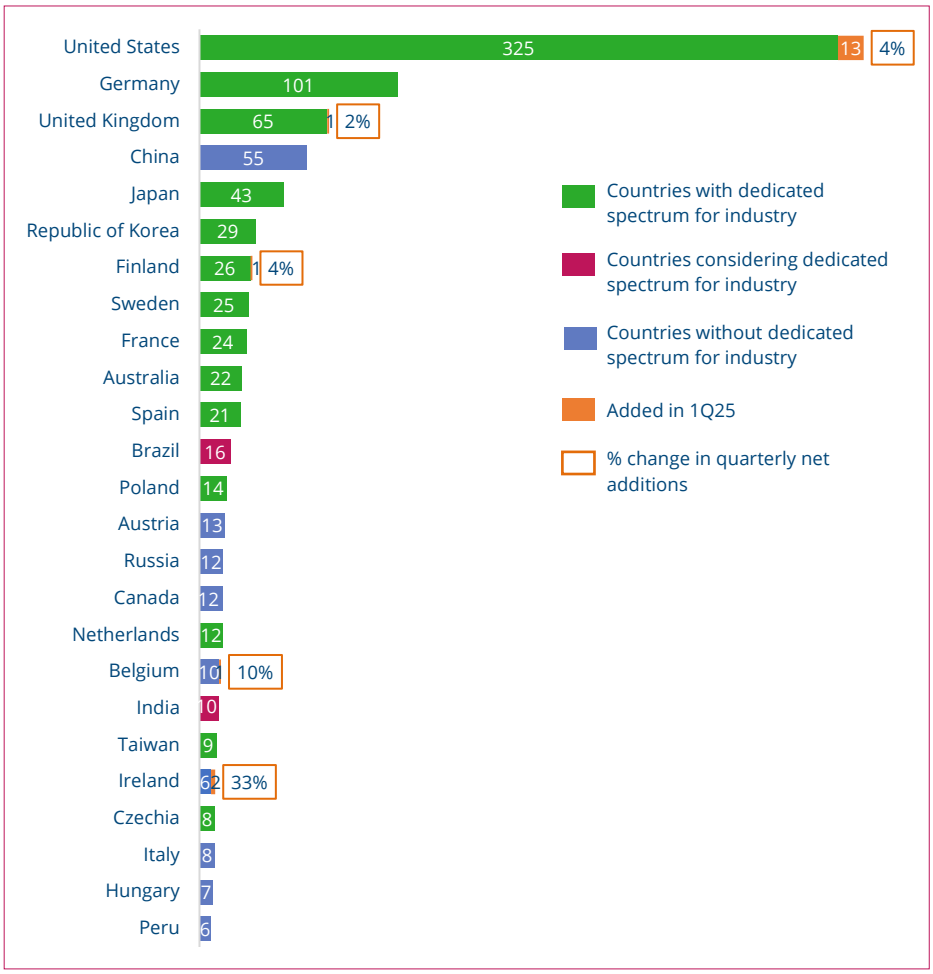
It is widely reported that China has a higher number of deployments than those seen here, with various large numbers being quoted, but we believe a large portion of those networks are using the public network only and therefore do not meet our definition.

Although Germany ranks second-highest by number of customer references, many of these deployments are still in trial and test-bed stage rather than full commercial deployments. Nine of the top 10 countries have dedicated spectrum for industry.

In 1Q25, of all reporting countries, the United States saw the largest increase in customers, adding 13 and growing 4% from 4Q24. Of the top 10 reporting countries, Finland grew 4% and the United Kingdom 2%. In the same period, Ireland climbed 33% and Belgium 10%, but from a much smaller total.

For more detailed information, members can refer to Annex 1, which presents all the countries that have dedicated locally licensed or leased spectrum for private enterprise networks. Please note that this table may be updated less regularly than every quarter.

Figure 14. Number of private network customers by country (base: 981 organisations deploying private wireless networks with revenue greater than €100,000, where country has been identified)



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ABOUT GSA

GSA is the voice of the global mobile ecosystem and has been representing mobile suppliers since 1998.

GSA Research

Mobile industry research is the backbone of GSA activity and covers topics from devices, chipsets and technology, to networks, features and spectrum.

The GSA research team is constantly following market dynamics and activity to ensure the latest data is available to GSA users via the GSA website.

Data is updated monthly and quarterly and can be referenced by users who register for free on the GSA website.

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